

## RHIC Procedure

### PHENIX Muon Identifier Panel Transport and Installation Procedure

Text Pages 1 through 15

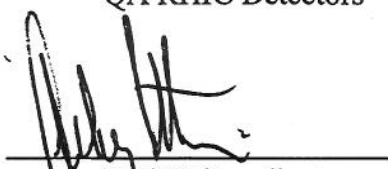
#### Hand Processed Changes

| HPC No. | Date    | Page Nos. | Initials |
|---------|---------|-----------|----------|
| ①       | 7/20/98 | 8         | w/s      |
| ②       | 7/28/98 | 11        | PSK      |
| ③       | 7/30/98 | 8 THRU 14 | w/s      |
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Revision No. C

Date: 7/14/98

  
QA RHIC Detectors

  
ES&H Coordinator

  
Cognizant Engineer

  
ES&H Services

**REVISION CONTROL SHEET**

| <b>LETTER</b> | <b>DESCRIPTION</b>                       | <b>DATE</b> | <b>WRITTEN BY</b> | <b>APPROVED BY</b>                                  | <b>CURRENT OVERSIGHT</b> |
|---------------|--|-------------|-------------------|---|--------------------------|
| A             | First Issue                              | n/a         | n/a               | n/a   | n/a                      |
| B             | No record of Revision                    | n/a         | n/a               | n/a   | n/a                      |
| C             | Latest Issue                             | 7/14/1998   | n/a               | Y. Makdisi, W. Stokes, A. Etkin, (1 unintelligible) | n/a                      |
| RETIRED       | Work described in procedure is completed | 3/13/2007   | n/a               | D.Lynch, P. Giannotti, R. Pisani for PHENIX         | D. Lynch                 |

# **PHENIX Muon Identifier Panel Transport and Installation Procedure**

## **1.0 Purpose and Scope**

This purpose of this procedure is to prescribe the PHENIX Muon Identifier Transport and Installation Procedure.

## **2.0 Responsibilities**

2.1 Authorized operators for this procedure shall perform the tasks described herein.

## **3.0 Prerequisites**

3.1 You must have a current BNL Safety Awareness Certificate (SAC).

3.2 All drawing numbers referenced include the 105-0213 prefix unless otherwise specified.

3.3 Personnel involved in this lift procedure shall wear hard hats in accordance with RHIC SEAPPM 1.16.0.

## **4.0 Precautions**

4.1 Some sections of this procedure will require Operator to work in close proximity to suspended loads. Do not permit yourself or anyone else to be positioned under the load.

4.2 Some operations will need to be performed at a height of 20 feet or 40 feet. These operations are marked as (20') or (40'). Fall protection is required.

4.3 When maneuvering the strongback/dolly assembly loaded with a panel, the dolly speed must not exceed 18 in/sec (90 ft/min or about 1 mph). Only use the towmotor (McMaster-Carr, part no. 22065T999) to maneuver the strongback/dolly when loaded with a panel.

4.4 The dolly strongback should undergo routine maintenance to verify the tightness of all bolts every two weeks.

## **5.0 Procedure**

### **5.1 Transfer panel from assembly table to vertical stand**

5.1.1 Position one forklift in building 905, east of the panel exit door.

- 5.1.2 If the strongback is already on the dolly, skip to section 5.1.17.
- 5.1.3 Back the trailer into building 905.
- 5.1.4 Remove pivot safety bolts holding strongback in the trailer tipping mechanism pivot (Item 2, Drwg. -616).
- 5.1.5 Lift strongback off of the trailer with the forklift at the bottom end and the building 905 bridge crane at the top shackle.
- 5.1.6 Pull trailer out of building 905.
- 5.1.7 Raise strongback to a height (6') such that it can be placed on the dolly.
- 5.1.8 Using the towmotor push the dolly into position under the strongback. The long axis of the dolly's counterweight will be north-south.
- 5.1.9 Lower the strongback into the dolly, engaging in the tipping mechanism pivot and install pivot safety pins.
- 5.1.10 Using the towmotor rotate the dolly/strongback by 90 degrees such that the counterweight is on the side near panel assembly table 4.
- 5.1.11 Using the towmotor move the dolly/strongback at a speed of less than 1 mph to the side of one of the assembly tables. Position such that the C-fixture is centered under the monorail crane of panel assembly table.
- 5.1.12 Chock the dolly wheels. (In lieu of chocking, dolly wheels may be rotated to face lengthwise along the dolly and locked in that position.)
- 5.1.13 Remove latch pins holding latches in unlatched position.
- 5.1.14 Using the monorail crane for one of the panel assembly tables, raise strongback to its vertical position.
- 5.1.15 Engage latches (Detail C, Drwg. -601) and install latch safety pins.
- 5.1.16 Until additional C-fixtures have their welds fixed, the C-fixture will need to be removed and connected onto the table whose panel is to be transferred. (20')

- 5.1.17 If necessary, move the dolly/strongback out of the way of the panel to be transferred using the towmotor at a speed of less than 1 mph.
- 5.1.18 Perform steps 5.1 – 5.14 of RHIC Procedure "PHENIX Muon Identifier Table Tilt Procedure."
- 5.1.19 Push panel as far from the table as possible along the monorail travel.
- 5.1.20 Push dolly/strongback into position with towmotor at a speed of less than 1 mph. The dolly must be between the panel and its assembly table, with the counterweight against the assembly table.
- 5.1.21 Chock the dolly wheels. (In lieu of chocking, dolly wheels may be rotated to face lengthwise along the dolly and locked in that position.)
- 5.1.22 Lower panel so that lift beam engages alignment pins in the lift fixture subassembly (Drwg. -613) on the top beam of the strongback (Drwg. -600). Engage safety pins holding the lift beam on the lift fixture subassembly (20').
- 5.1.23 Move monorail crane attachment from the lift beam to the assembly table C-fixture (20').
- 5.1.24 Lower the assembly table using the monorail crane.
- 5.1.25 Skip to section 5.3 if panel is being shipped directly to 1008.
- 5.1.26 Maneuver strongback, dolly and panel in front of the vertical stand (Drwg. -400).
- 5.1.27 Fine tune the alignment between the unistrut tracks of the lift beam (attached to the panel and strongback) and the vertical stand with jacks (Item 5, Drwg. -600) and side adjusting screws (Item 12, Drwg. -601) on the dolly.
- 5.1.28 Engage alignment block between the two unistrut tracks by sliding into place and attaching with unistrut bolts (20').
- 5.1.29 Remove locking bolt from unistrut track and raise safety pin (20').
- 5.1.30 Roll panel into unistrut track in vertical stand.
- 5.1.31 A safety pin in the vertical stand's unistrut track will engage automatically. Verify the safety pin has engaged.

## **5.2 Transfer of panel from vertical stand to strongback/dolly**

- 5.2.1 With one of the 905 monorail cranes, maneuver the lift beam and unistrut track assembly onto the alignment pins of the dolly strongback.
- 5.2.2 Maneuver strongback/dolly in front of vertical stand.
- 5.2.3 Fine tune the alignment between the unistrut tracks of the lift beam (attached to the dolly strongback) and the vertical stand with jacks and side adjusting screws on the dolly.
- 5.2.4 Engage alignment block between two unistrut tracks by sliding into place and attaching with unistrut bolts (20').
- 5.2.5 Raise storage stand unistrut track safety pin (20').
- 5.2.6 Roll panel into strongback's unistrut track.
- 5.2.7 A safety pin in the strongback's unistrut track will engage automatically. Verify the safety pin has engaged.
- 5.2.8 Attach hook clamps (Section BB, Drwg. -604) to secure bottom of panel to strongback.

## **5.3 Transfer panel and strongback from dolly to trailer**

- 5.3.1 Until additional C-fixtures have their welds fixed, the C-fixture will need to be removed from the assembly table and connected onto the liftfixture subassembly on the strongback. (20')
- 5.3.2 Move the monorail crane attachment to the strongback's C-fixture (20') and take up slack.
- 5.3.3 Install two of the angle pins (Part 9, Drwg. -612) for alignment.
- 5.3.4 Remove dolly's latch safety pins securing strongback/panel in the vertical position and manually disengage latches (Detail C, Drwg. -601). Reinstall pins to hold latch in open unlatched position.
- 5.3.5 Lower the strongback/panel using the assembly table's monorail crane. (Wheels were chocked in step 5.1.20.)
- 5.3.6 <sup>chock</sup>Unlock or ~~unlock~~ dolly wheels.

- 5.3.7 Using the towmotor move dolly/strongback/panel to north wall of 905. Maintain speed less than 1 mph.
- 5.3.8 Remove C-fixture with monorail crane.
- 5.3.9 Disengage lift beam safety clips from the liftfixture subassembly .
- 5.3.10 Detach unistrut track from lift beam.
- 5.3.11 Remove lift beam with monorail crane.
- 5.3.12 Remove liftfixture subassembly with monorail crane.
- 5.3.13 Slide unistrut track off panel cam rollers.
- 5.3.14 Install remaining angle pins into top beam of strongback/dolly and install washers and safety clips on all pins.
- 5.3.15 Lift strongback/panel off of dolly (6') with fork lift at bottom end and Bldg. 905 bridge crane connected to strongback shackle.
- 5.3.16 Using the towmotor maneuver the dolly out of the way.
- 5.3.17 Back trailer under strongback/panel.
- 5.3.18 Lower strongback/panel onto trailer, engaging in tipping mechanism pivot (Item 2, Drwg. -616) and install pivot safety bolts.
- 5.3.19 Slowly drive the panel to 1008.

#### **5.4 Transfer small panels from crate into 1008 support rails before receipt of the small panel strongback**

Note: Use this procedure to transfer small panels from their crate into the 1008 support rails if the small panel strongback is not available. After receipt of the small panel strongback, use procedure 5.5 for upper small panels or procedure 5.6 for lower small panels instead of this procedure.

- 5.4.1 Remove top and sides of shipping crate.
- 5.4.2 Expose uppermost panel.
- 5.4.3 Install cam rollers onto panel.
- 5.4.4 Use large strongback (Drwg. -604) as modified per drawing -623 and Carr-Lane hold down clamps listed on -623.

- 5.4.5 Install outer two angle pin plates (part no. 9 on Drwg. -612) in position to engage the outer slots in the upper rail of the small panel.
- 5.4.6 Rig strongback to be lifted horizontally using 2 crane hooks (Bldg. 1008) and three two-ton capacity nylon slings. Connect one sling from one crane hook to the strongback lifting eye. Connect a second sling from the second crane hook to one of the two angle brackets that connects the bottom rail of the strongback to the central portion. Connect a third sling also from the second crane hook to the other such angle bracket.
- 5.4.7 Lift strongback in horizontal position with panel side face down.
- 5.4.8 Lower strongback onto top panel and line up with angle pin plates.
- 5.4.9 Install inner two angle pin plates.
- 5.4.10 Install hairpin clips and washers on angle pin plates.
- 5.4.11 Clamp strongback to panel with Carr-Lane hold down clamps at 6 places as detailed on Drwg. -623. There are positions for clamping either a "B" or an "E" (lower) panel.
- 5.4.12 Install hook clamps securing bottom of panel to strongback.
- 5.4.13 Lift strongback and panel off of crate to a clear area.
- 5.4.14 Rotate strongback and panel to a vertical position.
- 5.4.15 Connect strongback to the dolly.
- 5.4.16 If a "B" panel is being handled, the strongback is lowered to a horizontal position and the following is performed:
  - 5.4.16.1 Install Lift Fixture ("I" beam, part no. 1 of Drwg. -613) on strongback.
  - 5.4.16.2 Install lift beam unistrut track on panel top rail over the cam rollers. Install restraining bolt to prevent panel's rolling in track.
  - 5.4.16.3 Install lift beam and connect to unistrut track.
  - 5.4.16.4 Install ball lock pins to restrain the lift beam to the mounting pins at the top of the strongback.
  - 5.4.16.5 Install C-fixture.
  - 5.4.16.6 Remove hairpin clips and washers.
  - 5.4.16.7 Remove angle pin plates.
  - 5.4.16.8 Connect crane to C-fixture and rotate strongback/panel to vertical position and engage dolly latches.
  - 5.4.16.9 Install latch safety pins holding strongback/panel vertical.
  - 5.4.16.10 Move crane hook from strongback's C-fixture to lift beam.
  - 5.4.16.11 Remove ball lock pins holding lift beam to strongback.
  - 5.4.16.12 Remove (6) Carr-Lane clamps.
  - 5.4.16.13 Proceed to step 5.7.11.
- 5.4.17 If an "E" panel is being handled, disconnect crane from strongback and proceed to step 5.7.10.2.4.



## **5.5 Transfer "B" (upper small) panels from crate into 1008 support rails**

Note: Use this procedure to transfer small panels from their crate into the 1008 support rails once the small panel strongback is available.

- 5.5.1 Remove top and sides of shipping crate.
- 5.5.2 Expose uppermost panel.
- 5.5.3 Install cam rollers onto panel.
- 5.5.4 Install strongback posts and post spacer (002-0504-532, -533) to floor.
- 5.5.5 Rig strongback (002-0504-530) to be lifted horizontally using three, two ton capacity, choker slings attached at the corners of the triangle formed by the strongback's diagonal bracing connecting the two slings at the lower corners to one crane hook and the other sling at the apex to the other.
- 5.5.6 Suspend strongback horizontally above panel maintaining just enough sling tension to allow positioning of the strongback to align panel attachment holes.
- 5.5.7 Attach strongback to panel using six M16 screws that thread into existing tooling holes in the side rails of the panel frame.
- 5.5.8 Install the panel lift beam unistrut channel onto the cam rollers on the panel.
- 5.5.9 Install the unistrut channel to panel restraining bolt at the inner position.
- 5.5.10 Mount the panel lift beam onto the strongback and unistrut channel.
- 5.5.11 Install 3/8" ball lock pins to restrain the lift beam to the mounting pins at the top of the strongback.
- 5.5.12 Re-rig strongback to be lifted from the two lower corners of the triangle formed by the strongback diagonal bracing by one of the crane hooks and by the attached lift beam with the other crane hook.
- 5.5.13 Lift the assembly horizontally until it is fully suspended.
- 5.5.14 Move crane to a clear area to allow the panel to be rotated into a vertical position.
- 5.5.15 Rotate the assembly into the vertical position by raising the crane hook attached to the lift beam at the top of the assembly and/or lowering the hook attached to the slings connected to the lower end of the assembly.
- 5.5.16 When vertical, place the assembly onto the stands by inserting the stand posts into the strongback's vertical rails and remove the crane hook from the lower slings.
- 5.5.17 Using a manlift (or ladder), remove the two 3/8" ball lock pins attaching the lift beam to the strongback.

- 5.5.18 Remove the three shipping and handling stiffeners running across the width of the panel.
- 5.5.19 If the panel is going to be installed in gap 4 or 5 north, use a 10-ton "D-ring" between the crane hook ("main lift hoist") and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.5.20 If the panel is going to be installed in gap 4 or 5 south:
  - 5.5.20.1 Attach a 3-ton chain hoist ("main lift hoist") to the crane trolley.
  - 5.5.20.2 Use a 3-ton "D-ring" between the main lift hoist and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.5.21 If the panel is going into gaps 1, 2, or 3 (north or south), attach the crane hook ("main lift hoist") to the lift beam using a shackle.
- 5.5.22 Remove the six 16M screws fastening the panel to the strongback (this will need to be accomplished by supporting the lift beam, hangers, and panel weight (~ one ton) with the main lift hoist to facilitate screw removal).
- 5.5.23 Lift the panel vertically away from the strongback leaving the strongback supported by its stands and the panel suspended and ready to install.
- 5.5.24 Proceed to step 5.7.13.3 for gap 4 or 5 north, to step 5.7.14.4 for gap 4 or 5 south, or to step 5.7.15 in all other cases.

## 5.6 Transfer "E" (lower small) panels from crate into 1008 support rails

- 5.6.1 Remove top and sides of shipping crate.
- 5.6.2 Expose uppermost panel.
- 5.6.3 Install strongback posts and post spacer (002-0504-532, -533) to floor.
- 5.6.4 Rig strongback (002-0504-530) to be lifted horizontally using two, one ton, choker slings attached at the lower corners of the triangle formed by the strongback's diagonal bracing connected to one crane hook and two, one ton, slings attached to the ~~strongbacks lifting brackets with shackles~~ <sup>CORNERS OF THE TOP CROSS RAIL</sup> ~~strongbacks lifting~~ <sup>OF THE FIXTURE AND</sup> connected to the other crane hook.
- 5.6.5 Suspend strongback horizontally above panel maintaining just enough sling tension to allow positioning of the strongback to align panel attachment holes.
- 5.6.6 Attach strongback to panel using six M16 screws that thread into existing tooling holes in the side rails of the panel frame.
- 5.6.7 Lift the assembly horizontally until it is fully suspended.
- 5.6.8 Move crane to a clear area to allow the panel to be rotated into a vertical position.
- 5.6.9 Rotate the assembly into the vertical position by raising the crane hook attached to the ~~lifting brackets at the top of the assembly and/or~~ <sup>RAIL</sup>

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- lowering the hook attached to the slings connected to the lower end of the assembly.
- 5.6.10 When vertical, place the assembly onto the stands by inserting the stand posts into the strongback's vertical rails and remove the both crane hooks from the slings.
- 5.6.11 Remove the three shipping and handling stiffeners running across the width of the panel.
- 5.6.12 If the panel is going to be installed in gap 4 or 5 north, use a 10-ton "D-ring" between the crane hook ("main lift hoist") and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.6.13 If the panel is going to be installed in gap 4 or 5 south:
- 5.6.13.1 Attach a 3-ton chain hoist ("main lift hoist") to the crane trolley.
- 5.6.13.2 Use a 3-ton "D-ring" between the main lift hoist and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.6.14 If the panel is going into gaps 1, 2, or 3 (north or south), attach the crane hook ("main lift hoist") to the lift beam using a shackle.
- 5.6.15 Suspend lift beam and roll lower panel hanging assembly into lift beam track.
- 5.6.16 A safety pin in the unistrut track will engage. Verify the safety pin has engaged.
- 5.6.17 Install restraining bolt.
- 5.6.18 Maneuver lift beam and lower-panel hanging fixture over strongback/dolly.
- 5.6.19 Attach hanging fixture rods to panel (20').
- 5.6.20 Remove the six 16M screws fastening the panel to the strongback (this will need to be accomplished by supporting the lift beam, hangers, and panel weight (~ one ton) with the main lift hoist to facilitate screw removal).
- 5.6.21 Lift the panel and lift beam assembly vertically away from the strongback leaving the strongback supported by its stands and the panel suspended and ready to install.
- 5.6.22 Proceed to step 5.7.13.3 for gap 4 or 5 north, to step 5.7.14.4 for gap 4 or 5 south, or to step step 5.7.15 in all other cases.

## **5.7 Transfer large panel from trailer into 1008 support rails**

**③** ~~5.7.1 Move dolly into place in 1008.~~

5.7.2 Back trailer up to 1008 roll-up door.

**WARNING: The strongback will not fit through the 1008 door in the horizontal position. Do not attempt to bring the strongback through**

the 1008 door without raising the scissor jack to the position indicated on the scissor jack (20 degrees).

5.7.3 Jack strongback/panel (20 degrees) so that it will clear the 1008 door using scissor jack (Item 5, Drwg. -616). The proper angle will be marked on the scissor jack and a warning will be posted to ensure that the table is jacked to the proper height before attempting to enter 1008.

5.7.4 Back trailer into 1008.

5.7.5 ~~Remove strongback/panel from trailer:~~ CHOCK TRAILER WHEELS & JACK UNDER TRAILER BED'S OUTERMOST ~~BEAM~~ EDGE (UNDER 'C' CHANNEL WEB) FORE AND AFT OF THE STRONGBACK

5.7.5.1 Chock the gap between the floor and the strongback.

5.7.5.2 Using the building crane attached to the strongback's lifting eye, rotate the strongback/panel off of the trailer, onto the timbers and into "vertical" position.

PIVOT MOUNT TO PREVENT TRAILER SAGGING TO ONE SIDE AND ~~MAINTAIN~~ MAINTAIN GROUND CLEARANCE

Note: ~~When lifted off the ground, the strongback panel will be off true vertical by a few tenths of a degree, i.e. a 1-2"~~

~~horizontal displacement~~  
FOR THE LOWER EDGE OF THE STRONGBACK

5.7.6 ~~Return scissor jack to fully lowered position.~~ USING THE BLDG CRANE CONNECTED TO THE STRONGBACK'S LIFTING EYE ROTATE THE STRONGBACK TO THE VERTICAL POSITION, ENGAGE LATCHES & INSTALL SAFETY PIN.

5.7.7 Chock dolly wheels. (In lieu of chocking, dolly wheels may be rotated to face lengthwise along the dolly and locked in that position.)

5.7.8 Maneuver strongback/panel to dolly. REMOVE CRANE HOOK FROM STRONGBACK

5.7.9 Lower into pivot brackets and install pivot safety pins. This operation will take three people: one to operate the crane and two to hold the strongback/panel 1-2" away from bottom of dolly until the pivot pins can engage.

RETRIEVE LIFTING BEAM ASSY WITH CRANE

Note: ~~Holding back the bottom of the panel will take less than 30 lbs. of force.~~

5.7.10 Attach lift beam to panel:

5.7.10.1 Upper panels:

5.7.10.1.1 WITH LIFT BEAM HANGING FROM CRANE, MANEUVER CHANNEL ONTO PANEL TO RAIL  
Lower strongback/panel to the horizontal position. TO ENGAGE CAMROLLERS

5.7.10.1.2 Remove hairpin clips and washers. Remove pins. INSTALL RETAINING BOLT, THRU CHANNEL AND TOP RAIL

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- 5.7.10.1.3 Slide unistrut track onto cam rollers on panel top rail. Safety pins will engage automatically. Verify that they have engaged and put in locking bolt.
- 5.7.10.1.4 Attach lift fixture subassembly to strongback top rail. REMOVE HAIRPIN CLIPS & WASHERS FROM PANEL TOP RAIL RETAINING BRACKETS
- 5.7.10.1.5 Using the 1008 crane, maneuver the lift beam onto the alignment pins in the lift fixture subassembly. Engage safety pins.
- 5.7.10.1.6 Attach lift beam to the unistrut track with grade 8 bolts.
- 5.7.10.1.7 Attach C-fixture to the lift fixture subassembly.
- 5.7.10.1.8 Using the building crane attached to the strongback's C-fixture, raise strongback/panel back to vertical position until latches engage.
- 5.7.10.1.9 Install latch safety pins holding strongback/panel in vertical position.
- 5.7.10.1.10 Move crane hook from strongback's C-fixture to lift beam (20').
- 5.7.10.1.11 Remove safety pins holding lift beam to strongback.

5.7.10.2 Lower panels:

- 5.7.10.2.1 Rotate the panel so that bottom of strongback engages latches.
- 5.7.10.2.2 Install latch safety pins holding strongback/panel in vertical position.
- 5.7.10.2.3 Disconnect chain hoist from strongback's lifting eye (20').
- 5.7.10.2.4 Mount assembled lower panel hanging fixture (Drwgs. -035 (large panels) and -036 (small panels) and secure to lift beam by rolling into lift beam unistrut track, and put in locking bolt.
- 5.7.10.2.5 A safety pin in the unistrut track will engage automatically. Verify the safety pin has engaged.
- 5.7.10.2.6 Maneuver lift beam and lower-panel hanging fixture over strongback/dolly. PANEL
- 5.7.10.2.7 Attach hanging fixture rods to panel (20').
- 5.7.10.2.8 Remove safety clips and washers from angle pins (20').

5.7.11 Remove hook clamps (Section BB, Drwg. -604) securing bottom of panel to strongback.

5.7.12 Remove panel from strongback

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- 5.7.12.1 ~~Upper panels: Move panel a few inches vertically to disengage from alignment pins in top rail of strongback/dolly.~~
  - 5.7.12.2 ~~Lower panels: Move panel a few inches horizontally to disengage panel from angle pins in top rail of strongback/dolly.~~

5.7.13 If panel is to be inserted into Gap 4 or 5 North:

- 5.7.13.1 Use a 10-ton "D-ring" between the crane hook ("main lift hoist") and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.7.13.2 Lift panel with the 10-ton main lift hoist.
- 5.7.13.3 Position the panel at the correct E-W location and as far north as the crane travel will permit.
- 5.7.13.4 Lock out bridge crane in this position.
- 5.7.13.5 Using a man-lift for access, attach a 3-ton chain hoist ("positioning hoist") to the bridge of the crane by wrapping two chains around the bridge beam. (The two chains are used in parallel for redundancy, each one rated at 7500 lbs.)
- 5.7.13.6 Position the hoist at the proper N-S position to line up with the gap.
- 5.7.13.7 Lower positioning hoist hook and attach to the "D-ring" of the lift beam.
- 5.7.13.8 Raise positioning hoist hook to transfer the panel from the main lift hoist to the positioning hoist.
- 5.7.13.9 Disengage main lift hoist hook.
- 5.7.13.10 Re-energize crane.

5.7.14 If panel is to be inserted into Gap 4 or 5 South:

- 5.7.14.1 Attach a 3-ton chain hoist ("main lift hoist") to the crane trolley.
- 5.7.14.2 Use a 3-ton "D-ring" between the main lift hoist and the panel lift beam. Attach the D-ring to the lift beam with a shackle.
- 5.7.14.3 Lift panel with the main lift hoist.
- 5.7.14.4 Position the panel at the correct E-W location and as far south as the crane travel will permit.
- 5.7.14.5 Lock out bridge crane in this position.



- 5.7.14.6 Protect the crane buss bars from damage by means of a cover or removal of a section if new hoist contacts crane buss bars.
- 5.7.14.7 Using a man-lift for access, attach a 3-ton chain hoist ("positioning hoist") to the bridge of the crane by wrapping two chains around the bridge beam. (The two chains are used in parallel for redundancy, each one rated at 7500 lbs.)
- 5.7.14.8 Position the hoist at the proper N-S position to line up with the gap.
- 5.7.14.9 Lower positioning hoist hook and attach to the "D-ring" of the lift beam.
- 5.7.14.10 Raise positioning hoist hook to transfer the panel from the main lift hoist to the positioning hoist.
- 5.7.14.11 Disengage main lift hoist hook.
- 5.7.15 Raise panel to proper level and maneuver panel to unistrut tracks of the permanent structure (Drwg. -038).
- 5.7.16 Verify level of both unistrut tracks (40').
- 5.7.17 Secure unistrut alignment block with unistrut bolts (40').
- 5.7.18 Re-verify level of both unistrut tracks (40').
- 5.7.19 Raise automatic safety pin (40').
- 5.7.20 Slowly slide panel into place.
- 5.7.21 Install positioning stop in permanent track.
- 5.7.22 Disengage lift beam from permanent tracks and store lift beam.
- 5.7.23 Attach main crane to strongback lifting eye.
- 5.7.24 Lower strongback ~~on dolly~~ *TO REST ON THE STILL ELEVATED SCISSOR JACK*
- 5.7.25 ~~Sling strongback horizontally using one sling at shackle and two slings at iron angle brackets.~~
- 5.7.26 ~~Remove dolly pivot pins.~~
- 5.7.27 ~~Perform lift.~~
- 5.7.28 ~~Install onto trailer with scissor jack lowered. Install trailer pivot safety bolts.~~

- ③ 5.7.29 *ASCERTAIN THAT SCISSOR JACK HEIGHT IS STILL ADEQUATE TO*  
*RAISE SCISSOR JACK TO ALLOW STRONGBACK TO PASS THROUGH DOOR.*  
*ALLOW PANEL TO PASS THRU DOOR*

**WARNING: The strongback will not fit through the 1008 door in the horizontal position. Do not attempt to bring the strongback through the 1008 door without raising the scissor jack to the position indicated on the scissor jack (20 degrees).**

5.7.30 Drive trailer and strongback out of 1008.

5.7.31 Lower scissor jack.

5.7.32 Drive trailer/strongback back to 905 with strongback in horizontal position.

## 6.0 Documentation

None.

## 7.0 References

- 7.1 BNL ES&H Standard 1.6.0, Material Handling: Equipment & Procedures
- 7.2 BNL ES&H Standard 1.6.1, Material Handling: Operator Training and Qualifications
- 7.3 DOE Hoisting and Rigging Manual

## 8.0 Attachments

Drawing 105-0213-035  
Drawing 105-0213-036  
Drawing 105-0213-038  
Drawing 105-0213-400  
Drawing 105-0213-600  
Drawing 105-0213-601  
Drawing 105-0213-604  
Drawing 105-0213-612  
Drawing 105-0213-613  
Drawing 105-0213-616  
Drawing 105-0213-623  
Drawing 002-0504-530  
Drawing 002-0504-532



Drawing 002-0504-533